

W. Hedberg

BARRICK

BARRICK RESOURCES (USA), INC.

May 17, 1993

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DIVISION OF
OIL GAS & MINING

Mr. Don A. Ostler, P.E.
Director
Division of Water Quality
Utah Department of Environmental Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870

Dear Mr. Ostler:

Barrick submitted to the Division Area 1 closure plans for review and approval on January 27, 1993. Subsequent to that submittal, the Division and Barrick have been in negotiations concerning the details of the Area 1 closure. The most recent Division correspondence dated April 23, 1993 identified what are considered to be the significant, remaining matters delaying final approval of the closure plan. Since receipt of this letter, Barrick and/or our agents have been in continuous contact with Division staff in an attempt to resolve this matter without jeopardizing 1993 construction or production schedules. The information supplied today by Barrick provides the Division with sufficient resources with which to immediately approve the closure plans for Area 1.

Attached please find for your review the following two documents prepared as a result of the Division's April 23, 1993 letter:

Document 1

Memorandum dated May 14, 1993 from B. W. Buck, JBR Consultants to G. M. Eurick, Barrick concerning design infiltration modeling discussions with D. Fredrick of the Division of Water Quality.

Document 2

Dames and Moore Report entitled "Solute Transport Analysis, Dump Leach Area 1, Mercur Gold Mine, Utah," Job No. 16550-005-031, May 17, 1993.

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The above noted documents can be effectively summarized as follows:

- The infiltration barrier (cap) design proposed by Barrick in January 1993 has been determined by utilization of the HELP Model to be the most environmentally preferable design.
- The predicted quantities of water modeled to be passing through the system during final closure have been shown to pose minimal potential degradation to area subsurface water characteristics and are not reasonably likely to pose a threat to public health and the environment.

Specific responses to the Division's April 23, 1993 letter are as follows:

UDWQ Item 1

While Barrick recognizes that certain liner system components in Area 1 have not retained their intended performance specifications, the Division has not provided sufficient rationale for a 1×10^{-7} cap permeability requirement. Barrick retained the services of JBR Consultants Group to work with Mr. Dennis Fredrick of your staff to resolve the matter of cap infiltration permeability requirements. The results of that effort are summarized in Document 1. As indicated, a component barrier system with a 12" clay component of 5×10^{-7} is achievable and complimentary to the overall performance of the barrier design.

The maximum expected frost penetration for the site is 35 inches (HRB in McCarthy, 1993). Section 3.6 of the previously submitted Closure Plan shows that subsoil will be placed in excess of that depth.

UDWQ Item 2

During interim utilization of the Area 1 site for ore stockpiling, the subsoil layer component will serve as primary protection for the clay component layer. In addition, all necessary erosion control measures will be maintained.

The subsoil layer will be scarified to accommodate vegetative root penetration prior to topsoil placement as per Section 5.3 of the submitted Closure Plan.

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UDWQ Item 3

Barrick is committed to this course of action, as per Section 5.4 of the submitted Closure Plan.

UDWQ Item 4

Pursuant to your expressed direction provided at our April 14, 1993 meeting, a basic pathway and fate analysis has been prepared and is attached as Document 2. Water characteristics utilized were those of Area 1 leakage collection samples, and the predicted flow quantity of 200,000 gallons/year was derived from modeling work completed with Mr. Fredrick of your staff as noted above in Item 1.

Dames and Moore conducted assessments of two methods of solute transport analysis applied to the evaluation of potential impacts to groundwater that could occur by seepage from Area 1. Based on rationale reasonably acceptable under the existing Area 1 conditions, the results of this assessment clearly indicate no significant threat to public health and the environment, and degradation of groundwater beyond acceptable levels will not likely occur as a result of advection, dispersion, and chemical adsorption.

UDWQ Item 5

It is unclear as to why compaction of the bulk fill is an object of concern. A highly compacted fill will result in diminished root penetration. If this is desired, then compaction can be effected.

The proposed 10-foot thick lifts are not too high to assure a reasonable compactive effort. Construction experience at the mine bears this out. During 1989 and 1990, Barrick placed 4,124,428 cubic yards of run-of-mine bulk fill for the foundation of Dump Leach 3. This material was placed in 10-foot thick lifts, to a maximum depth of 220 feet. To date, the settlement at the maximum fill depth is 0.74 feet, or 0.34 percent. In gross terms, the construction method achieved a relative compaction of 99.66 percent.

With the above history, no specification of compaction value is necessary. It must be recognized that the only material

which can be tested is the finer fraction. The material which controls compaction in an unsorted fill is the coarse fraction. Therefore, any conventional testing is unfounded.

UDWO Item 6

The surface runoff diversion structures will be sized to accommodate the 100-year, 24-hour storm event. They will be constructed as VEE's in cross-section, with nominal 2:1 sides. There will be a rockfill lining, with the particles sized to withstand the expected flow velocities. The lining thickness will be dependent on the particle sizing and erosive capacity of the flow. The design will conform to the existing Division of Oil, Gas and Mining permit criteria for runoff control and erosion minimization.

UDWO Item 7

The operational status of the existing cistern and leakage collection pumping system will be retained, since physical dewatering of the basin during the interim period of utilization of the area for ore stockpiling may be necessary. However, maintaining the cistern pumping system may preclude the construction of the design cap over an area of approximately 1,000 square feet, as this approach may be necessary to prevent cracking or collapsing the cistern with construction equipment. Specific provisions for this situation will require consultation between Barrick and the Division but should not delay overall closure plan approval.

Upon final closure of the Area 1 site, dewatering will be achieved by puncturing the basin floor and allowing the basin to drain to the subsurface environment.

UDWO Item 8

Topsoil will be placed to an uncompacted depth of 12 inches.

UDWO Item 9

All Area 1 water quality monitoring will conform to existing practices and procedures either currently performed as per

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UGW450001 or UGW450002 or negotiated with the Division pursuant to applicable surface or groundwater regulatory programs.

UDWQ Item 10

Post closure monitoring of the plant growth will continue until adequate plant growth has been attained, is self-propagating, and is in accordance with the Utah Division of Oil, Gas and Mining surety bond release provisions.

UDWQ Item 11

Table I, attached, has been revised to incorporate those and additional clarifications. Where applicable, the following QA/QC testing protocols are to be followed:

Laboratory Moisture/Density:	ASTM D1557-78
Field Moisture/Density:	ASTM D1556-82 or ASTM D2922-81
Sieve Analyses:	ASTM D421-78 ASTM D422-72
Atterberg Limits (PI):	ASTM D4318-84
Triaxial Permeability:	ASTM D5084-90

UDWQ Item 12

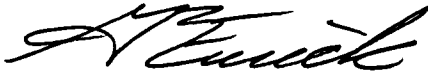
Table 1, attached, has been revised to incorporate the appropriate changes.

I would like to recognize the professional and timely efforts made by Mr. Fredrick of your staff in working with JBR personnel to complete the modeling work. This level of cooperation is an indication that industry and the Division can work together to expeditiously complete such tasks.

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Barrick is requesting your immediate attention be given to this correspondence and that approval of the Area 1 closure documents submitted be approved for construction within the next seven days. Please contact me should you have any questions concerning this correspondence. In my absence, contact Mr. Clayton Landa for assistance.

Respectfully,



Glenn M. Eurick
Environmental Affairs Coordinator (USA)

GME/cg

Enclosures

cc: D. P. Beatty
T. B. Faddies *w/o Dam*
C. L. Landa
C. L. Olsen *w/o Dam*
M. P. Richardson *w/o Dam*
R. R. Sacrison *w/o Dam*

M. Bateman (Tooele County)
D. Bird (Parsons Behle and Latimer)
L. Braxton (DOGM)
B. Buck (JBR)
L. Robison (Dames & Moore)

Barrick Resources (USA), Inc.
Dump Leach 1

RECLAMATION CAP SPECIFICATION

Component	Purpose	Thickness (ft)	Gradation	PI	Moisture	Compaction ⁽¹⁾	Permeability (cm/s) ⁽²⁾	QA/QC
Topsoil ⁽³⁾	Vegetation	1	N/A	N/A	N/A	None	4×10^{-4}	None
Subsoil ⁽⁴⁾	Vegetation, stockpile running surface	2 min	N/A	N/A	N/A	None	1×10^{-3}	None
Bulk Fill	Shape sides to max 2:1 slope	0-22	N/A	N/A	N/A	Compaction by wheel rolling, to minimize settlement.	1×10^{-3}	None
Clay Aggregate	Moisture barrier	1	6"x0	≥ 10	-3 to +5% of extraction moisture	Minimum four passes by track or wheel rolling with placement equipment.	$5 \times 10^{-7(5)}$	1 test, ASTM D-5084, per 40,000 sf of placement. Gradation, PI, moisture to match.

NOTES:

- (1) No compactive effort is to be expended on the top three components. Compaction diminishes their beneficial vegetative and/or hydraulic characteristics.
- (2) The permeabilities are provided for use in hydraulic modelling. They are not intended as performance specifications. See note 5 below.
- (3) During Phase I, topsoil is to be applied on the reclaimed slopes below the stockpile running surface. Phase II follows removal of all ore, when topsoil can be placed on the final surface.
- (4) Subsoil on the slopes below the stockpile running surface will be uncompacted and covered by topsoil in Phase I. Phase II follows removal of all ore, and the upper surface will be filled locally with additional subsoil to provide good drainage. Compacted subsoil surfaces will be scarified to enhance the vegetative benefit.
- (5) This permeability is a performance specification. The clay cap can be no greater than this value.

N/A - Not applicable.

REFERENCES

Highway Research Board, 1952, Frost Action in Roads and Airfields, HRB, Special Report No. 1, National Academy of Sciences - National Research Council, Pub. 211, Washington, D.C., IN McCarthy, D.F., 1993, Essentials of Soil Mechanics and Foundations, 4.ed., Regents/Prentice Hall, Inc., Englewood Cliffs, N.J.

McCarthy, D.F., 1993, Essentials of Soil Mechanics and Foundations, 4.ed., Regents/Prentice Hall, Inc., Englewood Cliffs, N.J.